

# Asthma in Maryland 2002

Prepared by the State of Maryland  
Department of Health and Mental Hygiene  
Family Health Administration  
Maryland Asthma Control Program

# MARYLAND ASTHMA SURVEILLANCE REPORT

2002

## **ACKNOWLEDGEMENTS**

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## Main Findings

- ◆ Statewide, 1 out of every 10 Marylanders has a history of asthma including: 445,759 adults and 143,754 children
- ◆ In an average year, asthma causes 8,000 hospitalizations; 31,000 emergency department visits and 78 deaths in Maryland
- ◆ Asthma affects some Marylanders more than others: the very young and the elderly; females; African-Americans; low-income individuals; and individuals in some jurisdictions, particularly Baltimore City
- ◆ In 2000, charges for hospital admissions due to asthma were \$28 million and \$18 million for emergency department visits
- ◆ Compared to those without asthma, adults with asthma perceive their general health less favorably and limit their activities because of their health more often

## Introduction

Asthma, a chronic condition affecting both children and adults, has been the focus of clinical and public health interventions during recent years. The Maryland Department of Health and Mental Hygiene received a Centers for Disease Control Prevention (CDC) grant in September 2001 to develop a State Asthma Surveillance Program and Plan. House Bill 420, enacted in the 2002 Maryland legislative session, placed the Maryland Asthma Control Program in statute. This is the first Surveillance Report from the Program.

This Report is based on existing datasets using information from the CDC Behavioral Risk Factor Surveillance System (BRFSS), the Maryland Health Services Cost Review Commission, the Vital Statistics Administration as well as information from the Maryland Department of the Environment.

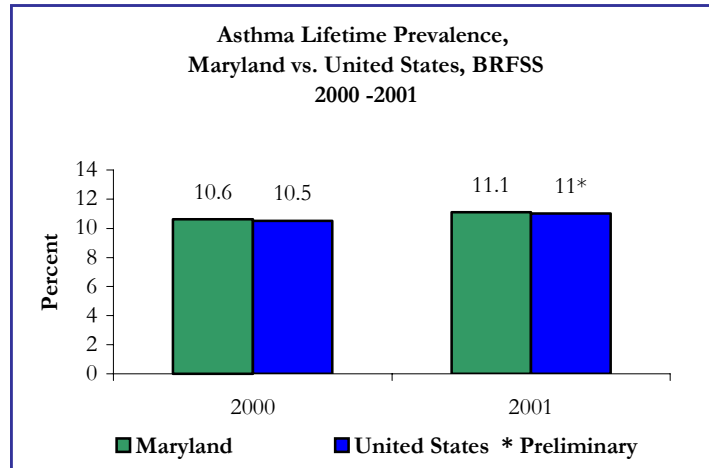
The prevalence of asthma in the United States has been increasing since 1980. In 2000, a total of 29.5 million persons in the United States reported a physician diagnosis of asthma sometime during their life. The Maryland Asthma Surveillance Program was developed to examine how this State compares to the national experience and to understand the potential risks to Maryland citizens. Such information will help achieve the ultimate goal of the Maryland Asthma Control Program to reduce the morbidity and mortality of asthma in Maryland, particularly in its most vulnerable populations.



*Source: American Lung Association of Maryland*

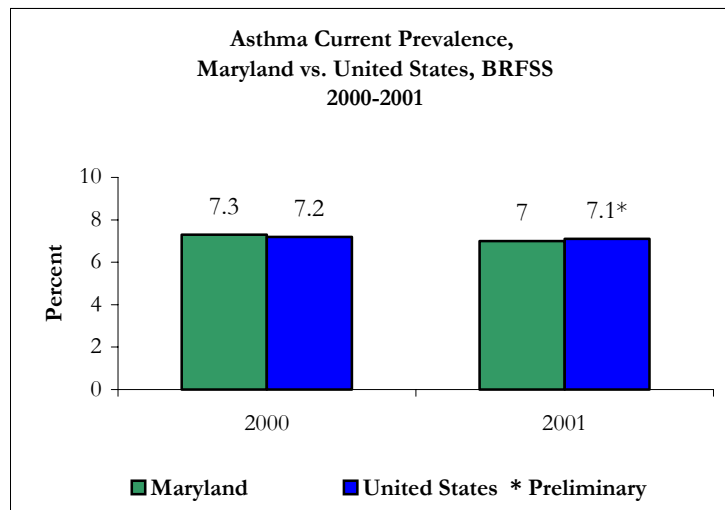
## Prevalence

Prevalence is a measure of the number of individuals who currently have or have had in the past a diagnosis of asthma. It is important to track prevalence rates in order to assess the input over time of this chronic illness. This information helps direct attention toward the causes of asthma or its episodes. For this report, prevalence was determined using the Behavioral Risk Factor Surveillance System (BRFSS), a statewide telephone survey of adults coordinated by the CDC and conducted in all 50 states. The questions related to asthma in 2000 and 2001 were: "Have you ever been told by a doctor that you have asthma?" (Lifetime Prevalence) and "Do you still have asthma?" (Current Prevalence). Lifetime asthma prevalence for Maryland residents over 18 years of age was 11.1% in 2001. Current asthma prevalence for Maryland adults was 7.0% in 2001. Therefore, over 400,000 adults have a history of asthma and almost 300,000 are currently suffering from the disease. National 2001 data is preliminary. Experience in Maryland has been comparable to that of the United States.



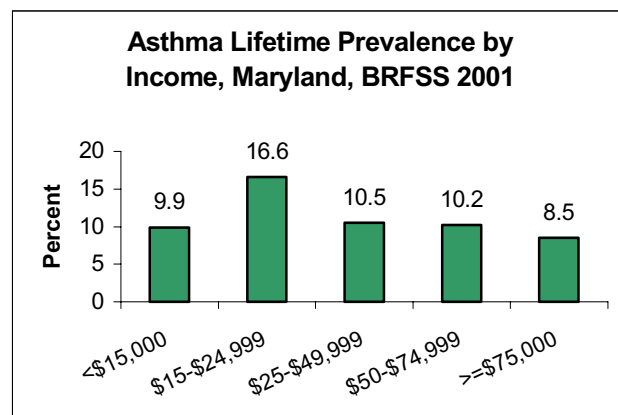
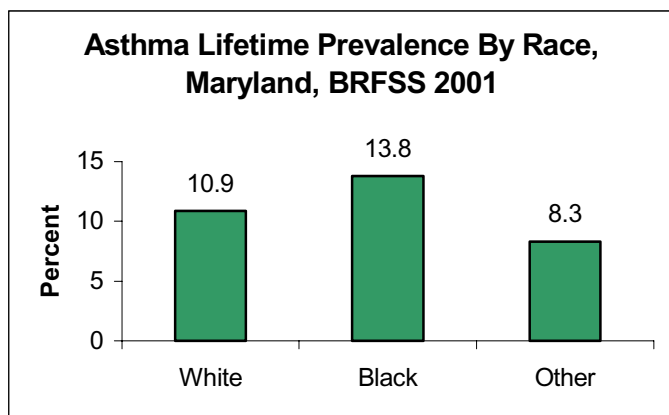
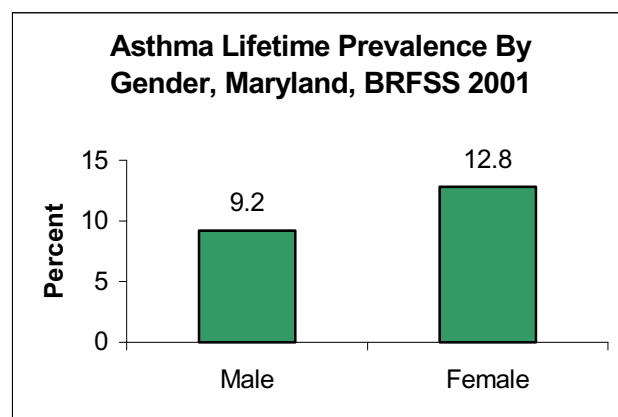
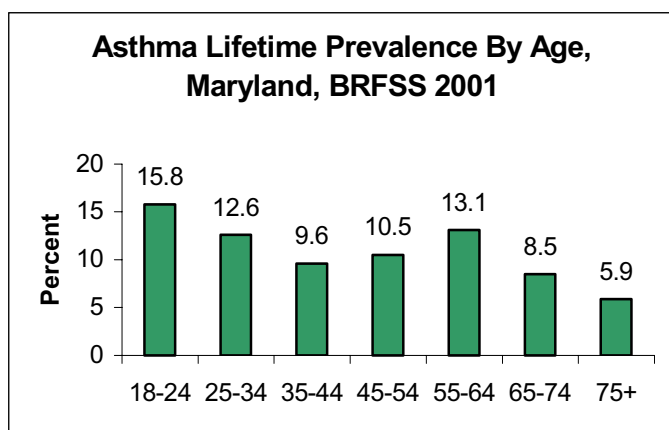
In Maryland, respondents were also asked if children in the household had been diagnosed with asthma. Of a total of 3,280 children under the age of 18 years in the households surveyed in 2001, 10.6% had been diagnosed with asthma. This equates to 143,754 children in Maryland. Sources other than the BRFSS must be utilized for more detailed information on the prevalence of asthma in childhood.

The BRFSS data indicates that overall 585,069 Maryland citizens, or more than 1 out of every 10 individuals, are directly affected by asthma. Many more Marylanders are touched by problems related to asthma in their families, workplace, schools and communities.



The BRFSS also demonstrates that not all persons in Maryland are equally at risk. Among the adult population, young adults, women, African Americans and individuals with lower incomes bear a disproportionate burden. These factors are often additive. Other data which demonstrate the severity of the disease show young children with increased episodes of severe events.

The graphs below depict the prevalence of asthma in Maryland adults by demographic characteristics.

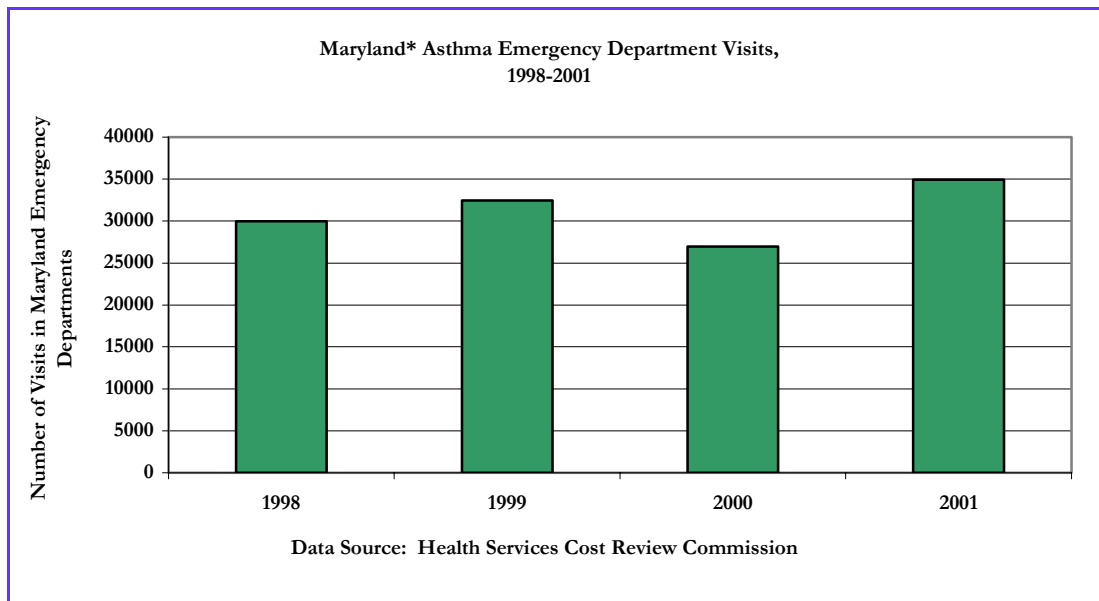


## Emergency Department Visits

Most individuals with asthma have mild disease. It is expected that persons with asthma can manage their condition with the avoidance of triggers, appropriate use of medications as necessary and routine healthcare by their primary health care provider with specialty consultation as required. Emergency department visits occur when persons with asthma develop symptoms which cannot be managed at home. It is believed that many, or even most of these events, can be avoided by appropriate and routine preventive care for these patients.

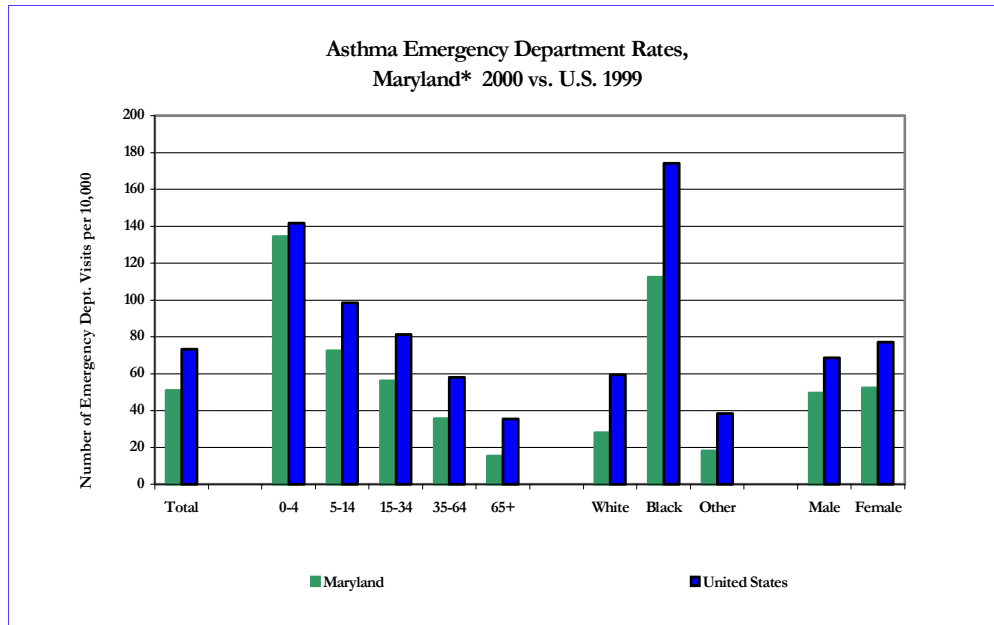
Information regarding emergency department visits is abstracted from the Maryland Health Services Cost Review Commission ambulatory care file. Data is available from April of 1997. Health Services Cost Review Commission datasets include patient information for Maryland hospitals. Since patients may seek emergency care in neighboring jurisdictions, underestimation of emergency department visits results.

Maryland residents average 31,000 emergency department visits per year for asthma. In 2001, there were 34,905 visits for a rate of 60 per 10,000 persons in the population. Nationally, 73.3 visits per 10,000 persons occurred in 1999. Maryland's emergency department visit rate for children less than 5 years of age is 134 per 10,000. This rate far exceeds the Healthy People 2010 goal of 80 per 10,000 in this age group. For older individuals current rates calculated from the Maryland Health Services Cost Review Commission data approximate Healthy People goals for 2010. Race, age and gender influence the likelihood of requiring emergency department care.



\*Maryland data does not include emergency department visits in neighboring states.





\* Maryland data from Health Services Cost Review Commission, does not include visits in other states. U. S. Data [See Reference 1]



## Hospitalizations

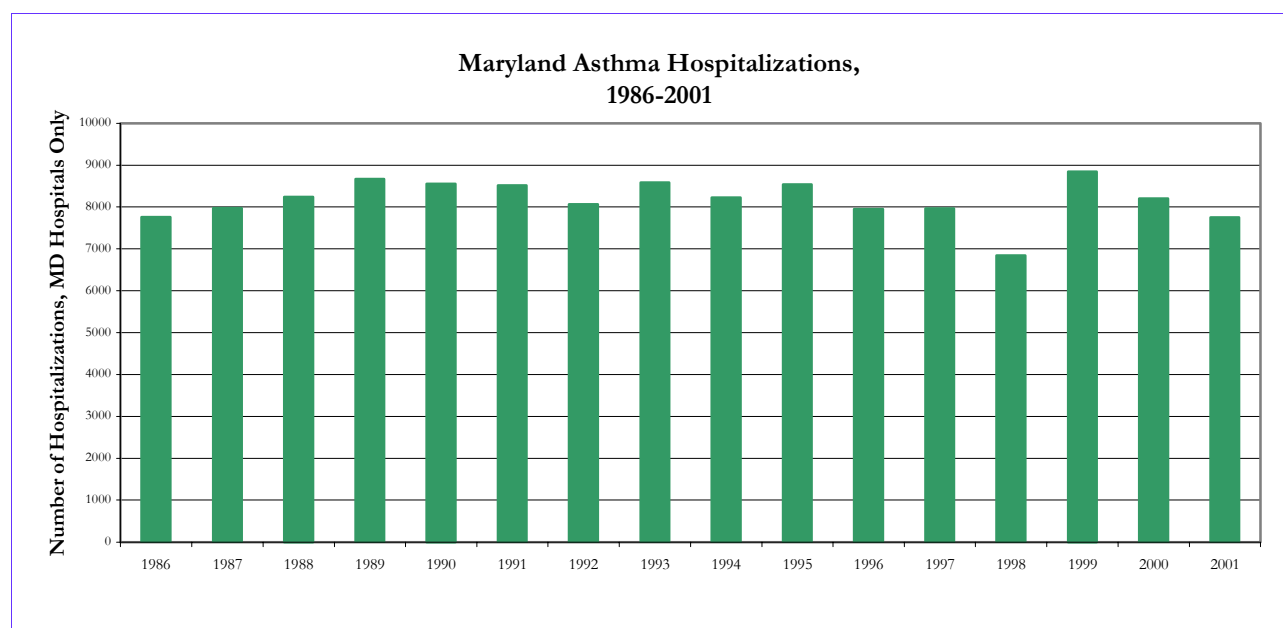
Patients whose asthma symptoms are so severe that their disease cannot be cared for on an out-patient basis require admission to the hospital. Hospitalization for asthma is generally considered a failure of out-patient management.

In Maryland, in an average year, there are 8,000 hospitalizations in which asthma is the primary diagnosis. There are an additional 5,000 admissions in which asthma is the secondary diagnosis complicating other conditions, often pneumonia.

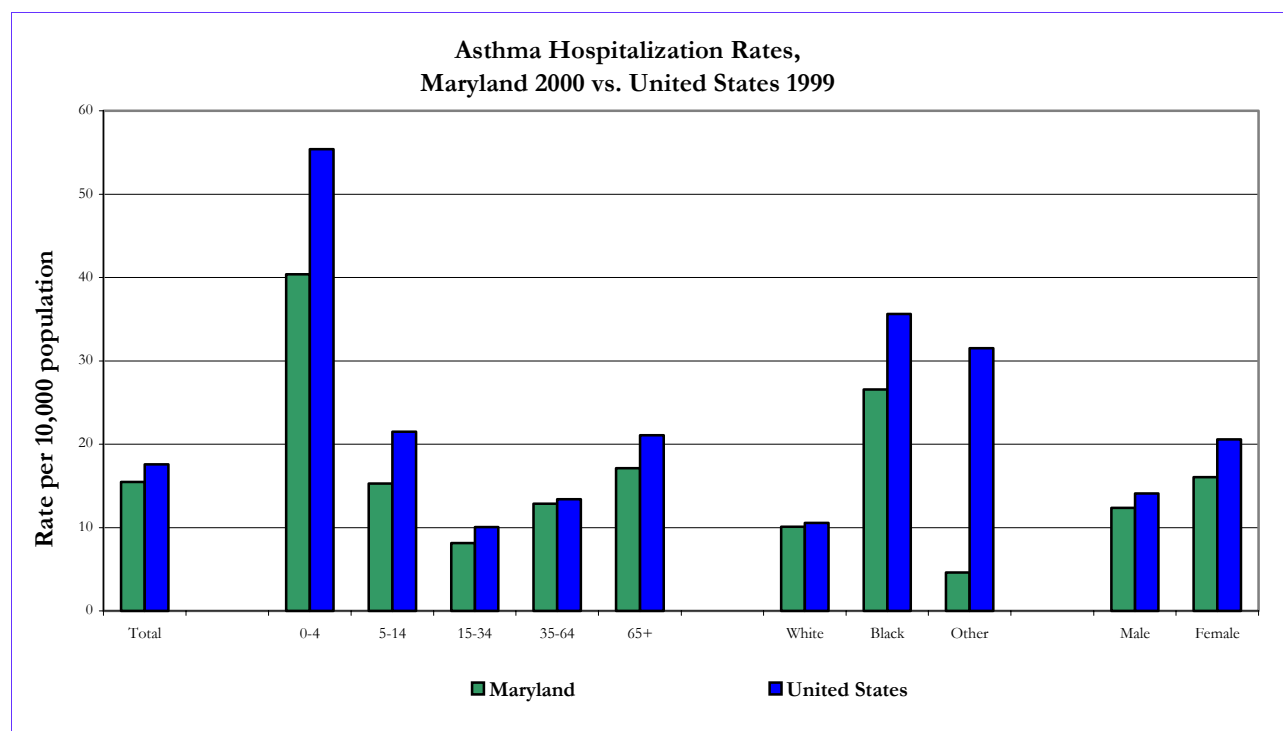
Hospitalization data is also obtained from the Maryland Health Services Cost Review Commission. This data is available since 1986. For hospitalizations, it has been possible to supplement the information from Maryland hospitals with some data from neighboring states (District of Columbia, Virginia, West Virginia, Pennsylvania, and Delaware) for 1999 to 2001. In 2000, there were 639 hospitalizations of Maryland residents in neighboring jurisdictions of which 85% occurred in the District of Columbia.

The overall rate of hospitalization in Maryland for a primary diagnosis of asthma in 2000 of 15.5 per 10,000 persons in the population is lower than the national average of 17.6 in 1999 [1]. However, all year 2000 rates for Maryland are substantially above the Healthy People 2010 goals. Hospitalization is more likely to be necessary for children less than five years of age. In addition, women more frequently require in-patient care for asthma as do African Americans. Once hospitalized, the average stay is 2.8 days.





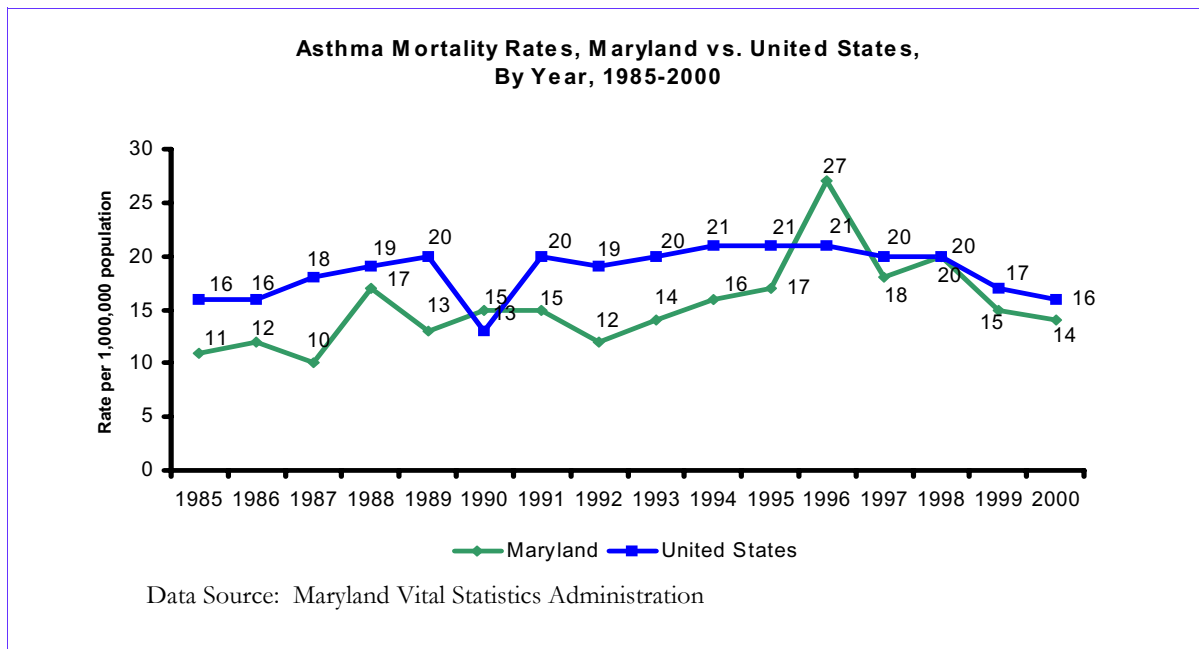
Data Source: Maryland Health Services Cost Review Commission



Data Source: Maryland Health Services Cost Review Commission: U. S. [See Reference 1]

## Deaths

Although asthma is a common condition, death from asthma is uncommon. However, as the primary cause of death it is generally considered preventable. Data for Maryland asthma deaths has been provided by the Maryland Vital Statistics Administration and includes all deaths of Maryland residents, regardless of place of death. In the 16 years from 1985 through 2000, there were 1,253 deaths from asthma in Maryland, an average of 78 per year (16 per 1,000,000 population). Maryland asthma mortality parallels the national experience [1].



Disparities in asthma mortality exist, with higher mortality rates documented among adults, African Americans and females. Recent asthma mortality rates in Maryland for all ages substantially exceed Healthy People 2010 Goals.

Maryland Asthma Deaths Maryland Vital Statistics Administration, 1985-2000			
Year	Number of Deaths	Year	Number of Deaths
1985	49	1993	70
1986	57	1994	84
1987	46	1995	91
1988	83	1996	138
1989	65	1997	95
1990	76	1998	106
1991	73	1999	80
1992	61	2000	79

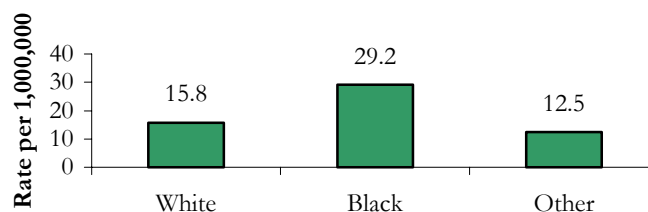
**MD Asthma Mortality Average Rate 1996-2000**  
**Healthy People 2010 Goals**



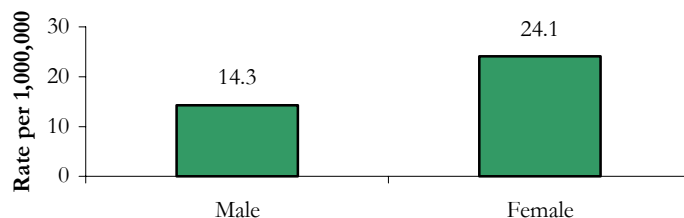
An asthma death is usually an acute event. Seventy six percent of individuals dying from asthma do so prior to admission to the hospital. A report by the Maryland Office of the Chief Medical Examiner in 1997 [2] demonstrated that individuals' homes were most often the site of the terminal event and that death was most likely to occur in the early morning hours. In addition, more fatal cases were noted in single persons.

Asthma deaths are believed to be almost uniformly preventable with regular healthcare and good asthma management. Understanding the specific circumstances surrounding death from asthma may help other patients and their providers avoid the conditions that lead to a fatal event and may underscore issues in management that have broad implications for all individuals with asthma.

**Average Asthma Mortality Rate By Race, Maryland, 1996-2000**



**Average Asthma Mortality Rate By Gender, Maryland, 1996-2000**



## Maryland Jurisdictions and Asthma

Variations exist within Maryland's 24 jurisdictions regarding the burden of the prevalence, hospitalizations and emergency department visits as well as mortality from asthma. In particular, Baltimore City residents are unduly affected, reflecting the experience of urban populations around the country. Some of this variability may reflect demographic differences throughout the State. Factors specific to individual communities may also play a role. Programs aimed at controlling asthma must take these differences into account.

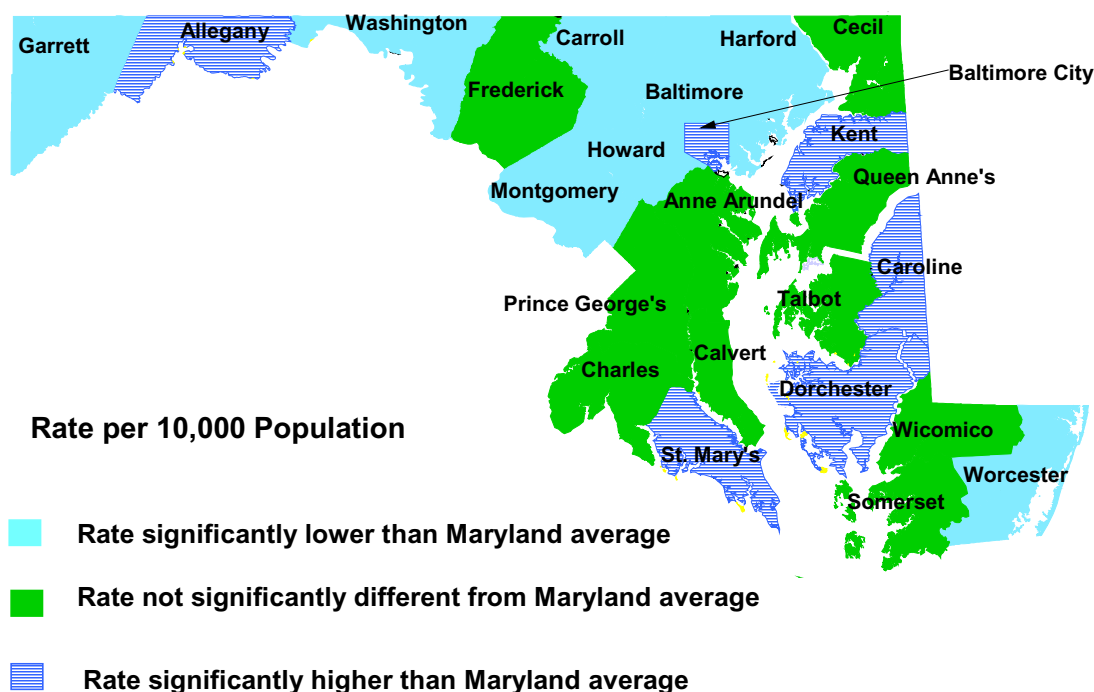
However, small numbers often make comparisons difficult, particularly if examining data on a yearly basis. For prevalence data using the BRFSS, sample sizes are relatively small per year but greater stability of the estimates occur when years are combined. Within Maryland, the number of deaths in many individual jurisdictions or regions are quite small even when years are combined, making statistical comparison difficult.

<b>Asthma Lifetime Prevalence Among Adults from the Combined 2000-2001 BRFSS</b>	
<b>Jurisdiction</b>	<b>Asthma Lifetime Prevalence among Adults</b>
Allegany	10.4%
Anne Arundel	9.9%
Baltimore City	15.3%
Baltimore County	11.0%
Calvert County	7.9%
Caroline County	13.6%
Carroll County	7.2%
Cecil County	10.3%
Charles County	10.9%
Dorchester County	10.9%
Frederick County	9.3%
Garrett County	11.4%
Harford County	7.7%
Howard County	9.9%
Kent County	11.6%
Montgomery County	9.4%
Prince Georges County	11.9%
Queen Anne's County	11.3%
St. Mary's County	14.4%
Somerset County	14.2%
Talbot County	7.2%
Washington County	10.3%
Wicomico County	9.5%
Worcester County	9.5%
<b>Maryland</b>	<b>10.8%</b>

<b>Average Asthma Mortality Rate By Jurisdiction, For Five Year Interval, Maryland, 1996-2000</b>		
<b>Jurisdiction</b>	<b>Average Annual Deaths</b>	<b>Average Rate per Million</b>
Allegany	3	46.7
Anne Arundel	6	13.0
Baltimore City	26	40.2
Baltimore Co.	12	15.9
Calvert	<1	8.4
Caroline	<1	6.8
Carroll	1	9.4
Cecil	<1	4.8
Charles	2	13.6
Dorchester	1	40.1
Frederick	3	17.1
Garrett	<1	13.6
Harford	4	17.7
Howard	3	12.7
Kent	<1	42.1
Montgomery	13	15.0
Prince George's	14	18.5
Queen Anne's	<1	20.2
Saint Mary's	<1	4.6
Somerset	1	49.1
Talbot	<1	24.1
Washington	3	24.9
Wicomico	1	17.4
Worcester	<1	18.5

Information regarding hospitalizations and emergency department visits are confounded by the fact that the major data source for this information, the Health Services Cost Review Commission, reflects only data from Maryland hospitals. Counties in which residents utilize facilities in neighboring states or the District of Columbia are under-represented when examining the Health Services Cost Review Commission data alone. In this Report, data on overall hospitalizations has been obtained from neighboring states for the years 1999 to 2001. These admissions are included in the overall rate calculation for 2000. Of the 639 Maryland residents hospitalized in adjacent states and the District of Columbia in 2000, 432 (68%) were from Prince George's County and 88 (14%) were from Montgomery County.

### Comparison of County Rates for Asthma Hospitalizations With the State Average, Maryland 2000



*Prepared by Isabelle Horon, Dr. P.H. Vital Statistics Administration*

**Asthma Number and Rate\* of Hospitalizations  
By Region and Political Subdivision, Maryland, 2000**

<b>Region and Political Subdivision</b>	<b>Number of Hospitalizations</b>	<b>Rate*</b>
<b>Maryland</b>	<b>8208</b>	<b>15.5</b>
<b>Northwest Area</b>	<b>625</b>	<b>14.5</b>
Garrett	33	11.1 **
Allegany	180	24.0 **
Washington	142	10.8 **
Frederick	270	13.8
<b>Baltimore Metro Area</b>	<b>4487</b>	<b>17.9 **</b>
Baltimore City	2106	32.3 **
Baltimore County	1048	13.9 **
Anne Arundel	734	15.0
Carroll	144	9.5 **
Howard	197	7.9 **
Harford	258	11.8 **
<b>National Capital Area</b>	<b>1962</b>	<b>11.7 **</b>
Montgomery	783	9.0 **
Prince George's	1179	14.7
<b>Southern Area</b>	<b>489</b>	<b>17.4 **</b>
Calvert	117	15.7
Charles	207	17.2
St. Mary's	165	19.1 **
<b>Eastern Shore Area</b>	<b>645</b>	<b>16.3</b>
Cecil	124	14.4
Kent	56	29.2 **
Queen Anne's	56	13.8
Caroline	84	28.2 **
Talbot	57	16.9
Dorchester	68	22.2 **
Wicomico	116	13.7
Somerset	45	18.2
Worcester	39	8.4 **

\*Per 10,000 population

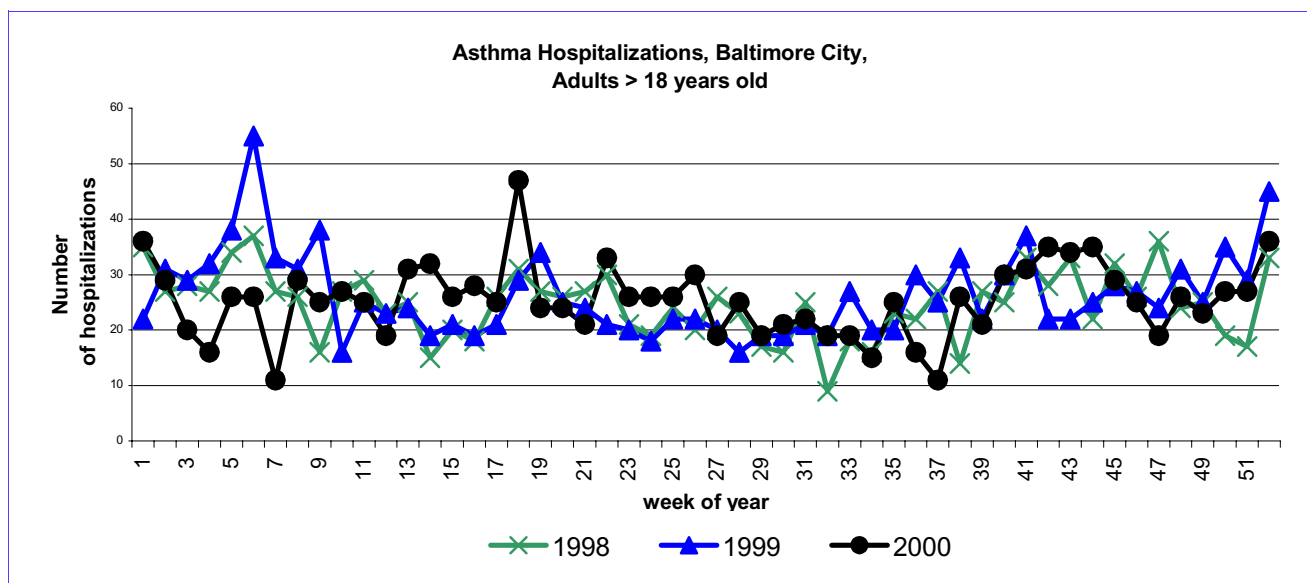
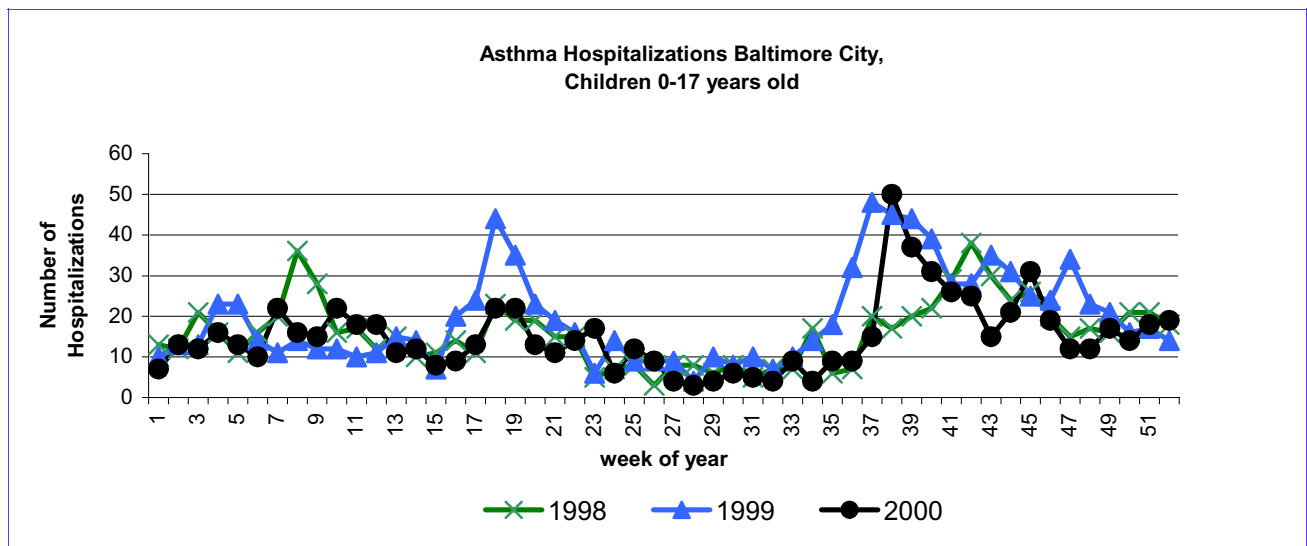
\*\*Rate differs significantly from the Maryland average (p<.05)



## Environmental Triggers

In addition to individual patient factors, asthma attacks may be triggered by irritant and allergic factors in both the indoor and outdoor environments. Viral respiratory tract infections may precipitate asthma episodes.

Episodes of increased asthma symptoms leading to hospitalizations are noted to be seasonal in children [3] but not so in adults. The cause of this pattern is unclear but knowledge of its occurrence is helpful in investigating the cause of asthma attacks and in planning for the care of asthma patients. The accompanying graphs demonstrate a seasonal spike in October for children's hospitalizations, but a more homogenous pattern for adults. Baltimore City is represented for the years 1998 to 2000, but a similar pattern is seen for the remainder of the State and in all years examined.



Factors in the indoor environment that serve as asthma triggers include environmental tobacco smoke (ETS), allergens from mold, dust mites, household pets, as well cockroaches and other pests. Emissions from gas stoves and outdoor air pollutants penetrating indoors are also implicated. Schools, work places, and vehicles are important sources of exposure to indoor air triggers in addition to homes. Routine datasets for surveillance of indoor air triggers for asthma attacks are not available except for information regarding smoking and exposure to environmental tobacco smoke. ETS is implicated not only as a major factor precipitating asthma attacks but may be a cause of asthma in children. In 2000, 20.5% of Maryland respondents to the BRFSS reported being current smokers compared to 23.2% nationwide. A similar percentage of persons with asthma in Maryland also smoked. Exposure to ETS is more widespread; 41% of adults, including those with asthma were exposed to tobacco smoke in the indoor environment; and children were exposed to tobacco smoke in the home at a similar frequency.

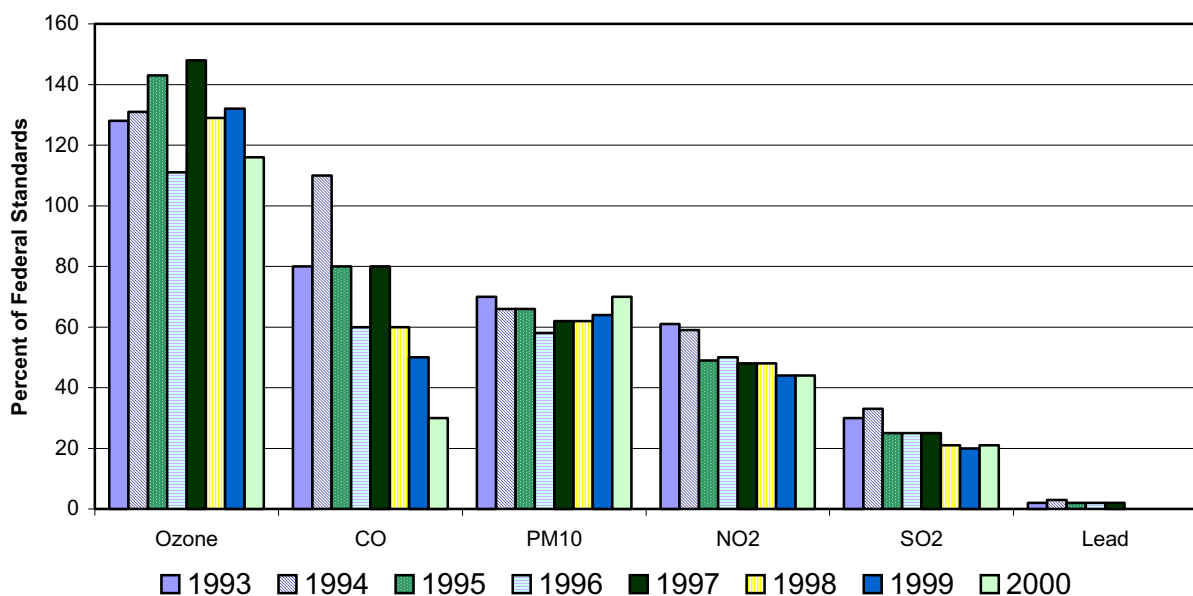
Information regarding exposure to other indoor allergens although not routinely available has been reported in investigations including Maryland children and settings by Maryland researchers [4, 5].

Asthma exacerbations have been associated with ambient (outdoor) air pollutants, airborne pollen and fungal spores, and meteorological factors (climatic conditions such as temperature, humidity, sunlight, wind). Most studies on asthma and air pollution have looked at ozone and fine particulate matter as they relate to the development or exacerbation of asthma. Children with asthma are particularly sensitive to environmental air quality.



The Environmental Protection Agency (EPA) has established public health-based ambient air quality standards for ozone, particulate matter (PM) and four other “criteria” pollutants. Maryland meets the air quality standards set by EPA on all pollutants except ozone. Data on these six criteria pollutants are available from the Maryland Department of the Environment (MDE).

**Pollutant Concentrations as Percent of Federal Standards,  
by Year, 1993-2000**

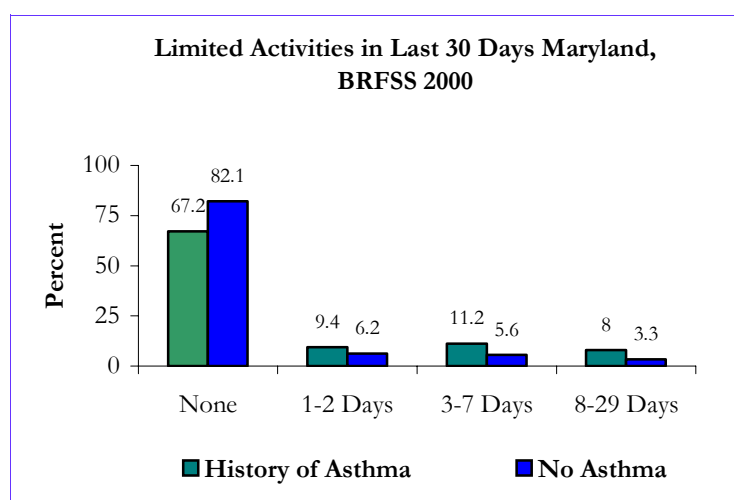
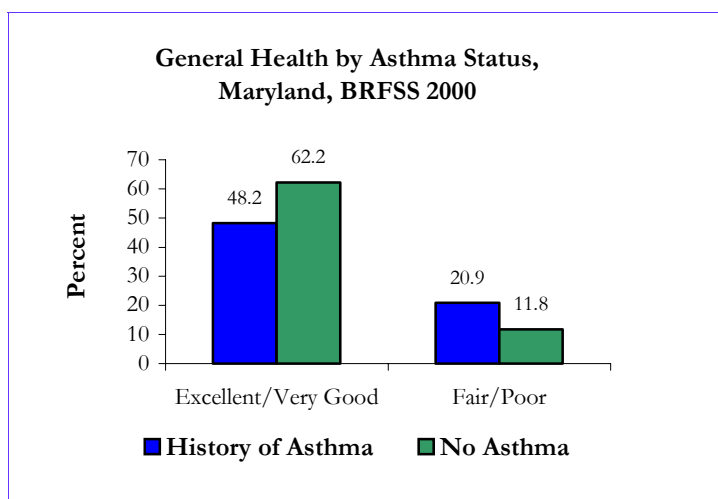


Data Source: Maryland Department of Environment

Although an association has been shown between ozone, particulate matter, other ambient air pollutants and adverse cardiorespiratory health outcomes including asthma, these relationships are complex. Additional measures of ambient air quality are thought necessary to fully understand environmental factors contributing to asthma episodes. Many variables must be tracked and correlated to demonstrate the contribution of environmental factors to the population burden of asthma. In a recent report of environmental pollutants and disease in American children, an expert panel estimated that, on average 30% of acute exacerbations of childhood asthma were related to ambient environmental factors [6].

## Cost of Asthma

The human cost of asthma in relation to acute episodes and the need for regular health interventions may be inferred from information already presented here. Marylanders with an asthma history give further indication of their life experiences in their responses to questions on the BRFSS. They perceive their general health less favorably and limit their activities because of their health more often as seen below. Days of limited activity, as well as days lost from school and work, result in diminished productivity and contribute to the indirect financial costs of health conditions.

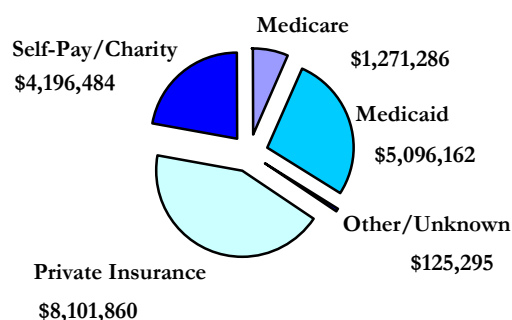


Asthma also exerts a direct financial burden on individuals and society. Data regarding the cost of asthma in Maryland can be examined by looking at charge data from the Maryland Health Services Cost Review Commission. In Maryland in 2000, the mean charge for a hospital in-patient stay for asthma was \$3,783. For an emergency department visit, \$604 in average charges were generated. Total hospitalization charges were \$28,785,779. Emergency department visits accounted for an additional \$18,791,088, for overall charges of \$47 million for hospital based treatment of asthma alone.

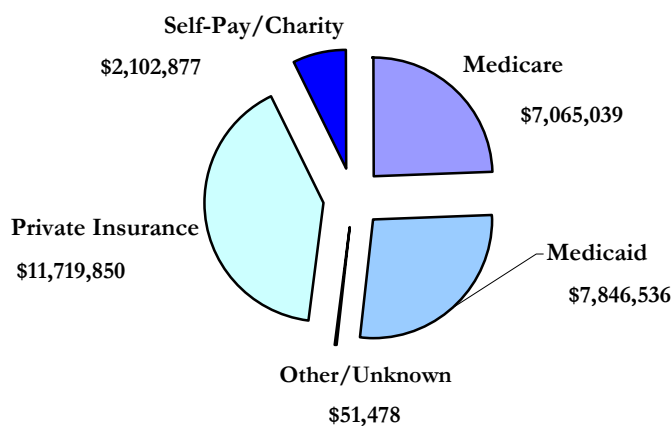
The distribution of charges by payor shows that individuals covered under Medicare and Medicaid account for 34% of charges for emergency room visits but 52% of hospitalization charges. The elderly and the low income individuals experience higher charges per event suggesting that they may be more ill when they present for care in the hospital setting.

It is important to emphasize that optimal asthma management has a goal of avoiding events requiring trips to the emergency room and inpatient settings. Outpatient visits and medications however are associated with a substantial financial cost. These may generate significant out of pocket expenditures for individuals. However, primary preventative care for asthma remains much less costly than hospital treatment.

**Health Services Cost Review Commission,  
2000 Maryland Emergency Department Charges by Primary Payor**



**Health Services Cost Review Commission,  
2000 Maryland Hospitalization Charges by Primary Payor**



## Conclusions

This Report confirms that asthma is a major health problem in Maryland, as it is in the rest of the nation. The Report shows that an estimated 10.6% of children and 7% of adults in Maryland currently have asthma. Hospitalization and emergency department visits are common but should be avoidable events. Mortality from asthma persists in Maryland. The cost of asthma to individuals and Maryland society as a whole is substantial. Additional tracking of the occurrence of asthma and asthma events is necessary to improve understanding of individual and environmental factors that contribute. Information gleaned from analyzing data such as that presented in this Report is critical to planning, implementing and evaluating activities aimed at reducing the personal and public health burden of asthma for Maryland residents.



*Source: American Lung Association of Maryland*

## Future Directions

The Maryland Asthma Control Program expects to produce ongoing surveillance reports. The datasets presented here will be refined and expanded with enhanced statistical analysis. In addition, plans exist for the inclusion of other datasets such as childhood prevalence data from school systems, data on utilization of services by Medicaid clients, more detailed correlations from the BRFSS as well as associations with environmental data. It is hoped that enhanced analysis of local level data will also serve jurisdictions and communities in addressing their specific problems related to asthma.

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